

data regarding transmission equipment; looking up a polled data registry to inspect a most recent entry of a polled property of the transmission equipment; and directly accessing the transmission equipment to request a status update.

[0028] The step of determining comprises steps of: ensuring that the at least one wavelength is not currently used on a link over which it is supposed to span; ensuring that the links in the wavelengths are operating within established parameters; and evaluating the signal transmission viability across each of the at least one wavelength.

[0029] The step of evaluating further comprises steps of: generating parameter values for transmission equipment on respective links to serve as coarse grain settings of the respective transmission equipment; and sending the parameter values to respective transmission equipment.

[0030] The method further comprises a step of effecting the reconfiguration of the optical transmission components to establish the communications channel.

[0031] The invention further provides a system for adaptively controlling communications channels in an agile optical network, the system comprising a wavelength and route manager (WRM) that determines a channel to be setup to satisfy a request for service between two network elements (A and B), using a route selection algorithm using at least one generic rule to evaluate a given set of routes between A and B, in order to identify a route; a route-based wavelength selector adapted to select at least one available wavelength subject to a constraint that the

at least one wavelength traces the selected route; and a constraint-based route validator that: verifies a viability of the at least one wavelength; and effects the set up of the communications channel between A and B, if the viability is verified.

BRIEF DESCRIPTION OF THE DRAWINGS

[0032] Further features and advantages of the present invention will become apparent from the following detailed description, taken in combination with the appended drawings, in which:

[0033] FIG. 1 is a schematic diagram illustrating principal elements of an exemplary WDM optical network that performs selective wavelength routing;

[0034] FIG. 2 is a block diagram illustrating principal functional elements in accordance with the invention for performing dynamic reconfiguration of communications channels, and principal operations performed by the respective functional elements;

[0035] FIG. 3 is a flow chart illustrating principal steps involved in performing dynamic reconfiguration of communications channels in accordance with the present invention; and

[0036] FIG. 4 is a flow chart illustrating principal steps involved in selecting at least one wavelength to establish a communications channel in accordance with an embodiment of the invention.

[0037] It should be noted that throughout the appended drawings, like features are identified by like reference numerals.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0038] The present invention relates to dynamic, efficient channel control in WDM optical networks that perform wavelength selective switching. In accordance with a preferred embodiment of the invention, data transport service requests are satisfied by layers of processes with respective functionalities that collectively allocate a wavelength (or a concatenation of wavelengths) for satisfying the data transport service request, if the request is determined to be serviceable. The invention therefore enables an agile optical network that autonomously reconfigures in response to fluctuating traffic loads.

[0039] FIG. 1 illustrates an exemplary configuration for a WDM network that can be operated as an agile optical network using the methods and apparatus in accordance with the invention. Links 10 in optical networks may vary considerably with respect to the distances they span and the number of amplification sites 12 they include. There may be other differences as well, including differences in amplification site topologies, fiber types, number of wavelengths, etc. There are also differences in the structures of all-optical cross-connects 14, which absorb a proportion of signal power and introduce signal degradation and noise in amounts dependent on their respective architectures. Links 10 are terminated at opposite ends by one of: a terminal 16 or a regenerator 20, and may be terminated at sites containing\, an all-optical